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B8K KWC
U1S S1105 S1789 S1814

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GB 1604211 A
Chambers Encylopedia 1973 p. 482-483, passage headed "MANUFACTURE", see, in particular, the drying to approximately 2% in the third paragraph on p483.

(58) Field of search
UK CL (Edition K) A2B BAGA, F4G G2G G9BS
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(54) Method and apparatus for treating and packing tea

(57) To reduce or overcome the problem of loss of quality of the liquor of tea a method for treating and packing tea prior to transportation from the tea estate includes the steps of withering the picked green tea leaf over a period of time to reduce its moisture content and bring about a chemical change in the leaf, and feeding this withered leaf to processing machinery in order to rupture the cells within the leaf and commence the fermentation process. The method also includes the steps of drying the fermented processed withered leaf down to a maximum of 4% moisture, conveying at least one such grade to vacuum packing machinery and using the said machinery to vacuum pack into bags each holding not less than 20 kilograms of tea. After the drying step, a sorting into size grades is preferably carried out. Particular laminates comprising layers of polyester, aluminium, polyolefins possibly with a layer of polyamide may be used on the bag.

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FIG.1.

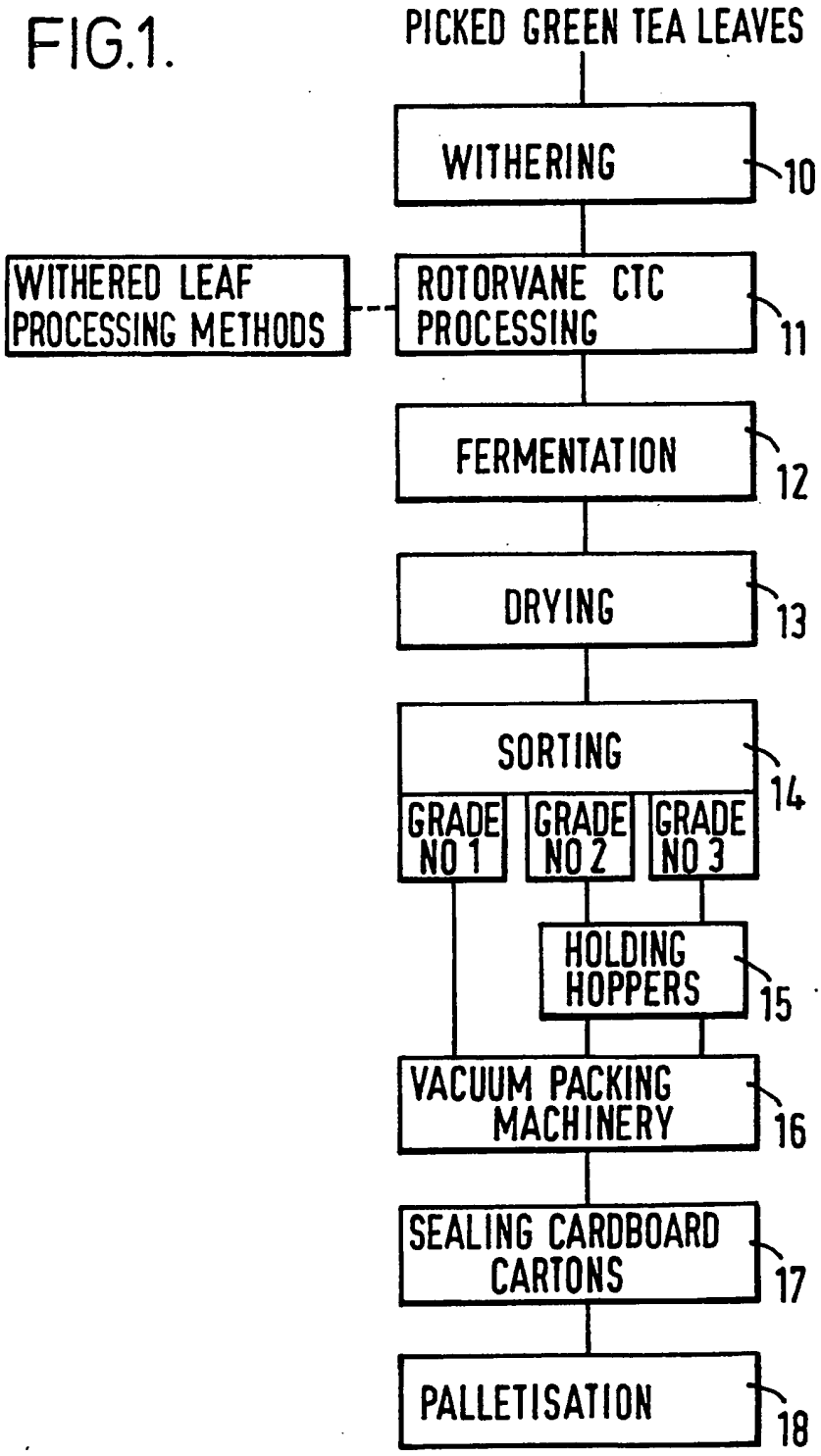
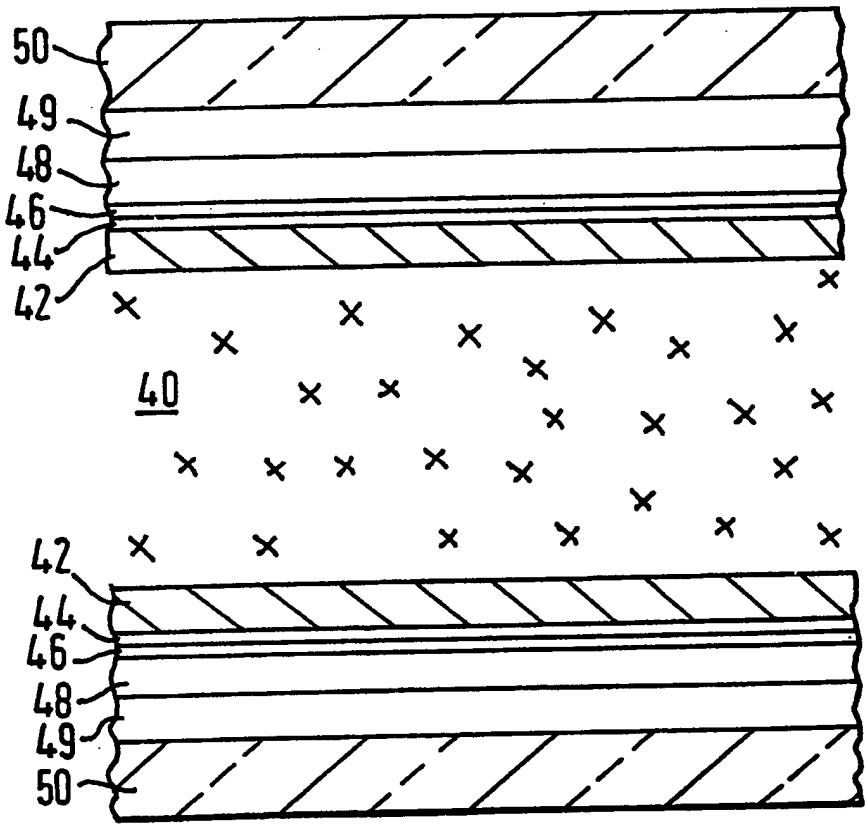

PICKED GREEN TEA LEAVES
WITHERING
10
WITHERED LEAF PROCESSING METHODS
ROTORVANE CTC PROCESSING
11
FERMENTATION
12
DRYING
13
SORTING
14
GRADE NO 1
GRADE NO 2
GRADE NO 3
HOLDING HOPPERS
15
VACUUM PACKING MACHINERY
16
SEALING CARDBOARD CARTONS
17
PALLETISATION
18

FIG.2.



METHOD AND APPARATUS FOR TREATING AND PACKING TEA

This invention relates to a method and apparatus for packing tea.

Tea has been a popular drink for several hundred years. It has been imported to Western Europe and the Western Hemisphere from India and neighbouring countries, packed in wooden tea chests, for a considerable period. One of the factors inhibiting further increase in the popularity of tea is the variability in the quality of the product when it arrives at its destination. Because of the quantity involved, air transport is not economic and the transfer is by ship. The journey time is variable and can take, on average, some two months. Coupled with the fact that the crop may be stored before despatch or before use, there is a considerable period of storage and transport during which the quality can deteriorate. Storage on tea estates where the tea is grown is often necessary but quality can soon fall due to the high ambient temperature (e.g.35-40°C) and the high humidity (90% or more relative humidity).

It is an aim of the present invention to reduce or overcome the problem of loss of quality of the liquor of tea.

According to the present invention, a method for treating and packing tea prior to transportation from the tea estate includes the steps of withering the picked green tea leaf over a period of time to reduce its moisture content and bring about a chemical change in the leaf, feeding this withered leaf to processing machinery in order to rupture the cells within the leaf and commence the fermentation process followed by drying the fermented processed withered leaf down to a maximum of 4% moisture, then, as an optional step, immediately sorting the dried leaf into a plurality of size grades, conveying at least one such grade to vacuum packing machinery and using the said machinery to vacuum pack it into bags each holding not less than 20 kilograms of tea.

In a preferred version of the invention, the resulting package comprises a bag made of a multiple layer laminate. Such a laminate preferably has the following layers:

an inner layer of a synthetic plastics material having good vapour and gas barrier properties, an intervening layer of thin aluminium foil, and at least one further layer of plastics material.

In a specially preferred version of the invention, the tea in treated leaf form is placed within an inner bag of plastics material, e.g. a bag made from 100 micron thick polyethylene film. The laminate referred to is preferably adhesively attached to the exterior of the inner bag, though this attachment is not essential to the invention. The combination of the inner bag and the laminate may be located within a cardboard, wooden or kraft paper box or other suitable outer casing. This casing provides mechanical protection during handling and transit.

By the use of the invention it is for the first time possible to treat and vacuum pack tea in a bag which substantially prevents deterioration in transit between the tea-growing estate and the eventual market destination, irrespective of the time taken in transit. Moreover the package can be economically and conveniently handled either singly or in multiples by mechanical handling machinery.

In the vacuum packing step, it is preferable to employ a substantially vertical gravity feed of material into an open-topped bag made as described above, which is then sealed across the top by a clamping action provided by a pair of reciprocable heat sealing bars.

The invention will be better understood from the following non-limiting description of a particular and illustrative embodiment, given with reference to the accompanying drawings, in which:-

Figure 1 illustrates in block diagram form one example of a method according to the invention; and

Figure 2 is a vertical cross-section through one example of package usable in the method of the invention.

Refering firstly to Figure 1, this illustrates an embodiment of the invention in which freshly picked green tea leaves are first subjected to withering 10, that is to say their moisture content is reduced, usually over

some 12 to 20 hours, and the leaf undergoes some chemical changes. Withering may for example be done by spreading the picked green leaves some 12 inches thick in troughs and passing air through the bed of leaf to bring about a gradual loss of moisture. Alternatively the leaves may be withered in other ways. After the withering process at 10, the withered leaves are mechanically ruptured to bring about fermentation, for example by passing the withered leaves through a machine which has a mincing action on the leaves, e.g. a conventional "ROTORVANE" machine. Thereafter the leaves are passed through one or more cut tear and curl (C.T.C.) machines of known type. as seen at 11. Thereafter the processed withered leaf is allowed to ferment to the desired degree using oxygen from ambient or conditioned air.

Following fermentation 12 the leaves are passed to hot air dryers operated at, for example, some 200°F (about 93°C) inlet air temperature, at step 13. Following this step the dried tea leaves pass to a sorting step during which the tea leaves are sorted or graded by screening or sieving into 1, 2, 3, 4, or more different sizes. The sorting step 14 in Figure 1 shows as an example the tea sorted into three different sizes or grades. While a sorting step is preferred, it can be omitted and is not essential to the present invention. Each grade of tea is then fed by conveyor to a feed hopper attached to a vacuum packing machine 16, or to holding hoppers 15 for vacuum packing as and when the vacuum packing machinery becomes available. The grade of tea in the feed hopper is fed by gravity into a laminated bag placed inside a cardboard carton. From here the carton containing the bag is fed into the vacuum chamber where after the vacuum packing process the packed and sealed product is ejected and conveyed to a station 17 at which the cardboard carton is sealed. The sealed cardboard cartons are then palletised 18 and ready for despatch, containerisation and shipment.

The synthetic plastics bag within which the tea product is placed in step 16 preferably comprises a multi-layer laminate having at least

three layers, and is diagramatically illustrated in Figure 2 of the accompanying drawings. Figure 2 is a cross-section across part of a package containing tea 40. The tea is placed within an inner bag 42. The bag 42 may have walls made of polyethylene (75% LLDPE, 25% LDPE) of about 100 microns in thickness. Inner bags of other plastics materials may also be suitable. Adhesively attached to the outer surface of the bag 42 is a trilaminate having layers 44, 46, 48. As shown, there is no adhesive join and there may be a small air gap 49 between the outer surface of the laminate 44, 46, 48 and the outer casing 50. One example of a suitable material for the trilaminate 44, 46, 48 is Laminate A.

Laminate A

12 micron thick polyester (44)

adhesive

12 micron thick aluminium foil (46)

adhesive

100 micron thick low density polyethelene (comprising 75% linear low density polyethylene (LLDPE), 25% low density polyethylene (LDPE) (48).

An example of another laminate which may be used instead of Laminate A is:

Laminate B

12 micron thick polyester

adhesive

15 micron thick nylon

adhesive

12 micron thick aluminium foil

adhesive

100 micron polythene (75% LLDPE 25% LDPE).

Laminate A or Laminate B may be adhesively attached onto the exterior surface of an open-topped bag made for example of 100 micron thick sheet of 75% LLDPE, 25% LDPE polyethylene. The purpose of this

inner bag is to strengthen the package and make it more durable. It may however be omitted, particularly where the laminate used differs from Laminate A in having thicker layers or a nylon layer which provides increased strength and toughness.

The package resulting from the vacuum packing step described is, as stated, finally encased in a cardboard or kraft paper or other suitable outer casing 50. Alternatively it may be placed within a wooden box. Contrary to conventional methods of transport of tea, the tea so encased maintains its quality even during the lengthy transport and storage from tea estate to the blenders and repackers who put the tea into packets ready for wholesaling or retailing.

The preferred size of a bag for bulk tea is one which holds a quantity of tea such that the weight of the package inclusive of packaging is over 50 kilograms.

Without departing from the invention, other specific plastics bags or multi-layer laminates may be employed but the described laminates are considered to be preferable from the points of view of strength, cost, and capability of preserving tea in good condition over a prolonged period.

CLAIMS

1. A method for treating and packing tea prior to transportation from the tea estate including the steps of withering the picked green tea leaf over a period of time to reduce its moisture content and bring about a chemical change in the leaf, feeding this withered leaf to processing machinery in order to rupture the cells within the leaf and commence the fermentation process followed by drying the fermented processed withered leaf down to a maximum of 4% moisture, then, as an optional step, immediately sorting the dried leaf into a plurality of size grades, conveying at least one such grade to vacuum packing machinery and using the said machinery to vacuum pack it into bags each holding not less than 20 kilograms of tea.

2. A method according to claim 1 in which the tea is vacuum packed into a bag made of a multiple layer laminate.

3. A method according to claim 2 in which the said multiple layer laminate has the following layers:

an inner layer of a synthetic plastics material having good vapour and gas barrier properties, an intervening layer of thin aluminium foil, and at least one further layer of plastics material.

4. A method according to claim 1, 2 or 3 in which the tea in treated leaf form is placed within an inner bag of plastics material, e.g. a bag made from 100 micron thick polyethylene film.

5. A method according to any preceding claim in which, in the vacuum packing step, there is employed a substantially vertical gravity feed of material into an open-topped bag, which is then sealed across the top by a clamping action provided by a pair of reciprocable heat sealing bars.

6. A method of packing tea substantially as herein described with reference to and as illustrated in the accompanying drawings.

7. Apparatus intended for packing tea at the tea estate where the leaf is grown, including means for withering the plucked leaf, means for mechanically rupturing the withered leaf, means for fermenting the ruptured leaf, hot air dryers for reducing the moisture in the fermented leaf, and a machine for vacuum packing and sealing the dried leaf into synthetic plastics bags of a size and construction to hold not less than 20 kilograms of tea.

8. Apparatus according to claim 7 including sorting or sieving means for dividing the air-dried leaf into at least two different size grades.

9. Apparatus according to claim 7 or 8 further including means for receiving and sealing cardboard cartons which contain the said synthetic plastics bags.

10. Apparatus according to claim 9 including means for palletising the sealed cardboard cartons.

11. Apparatus for packing tea substantially as herein described with reference to and as illustrated in the accompanying drawings.

12. Any novel combination or sub-combination disclosed and/or illustrated herein.